

REMARKS

Claims 37 and 46 are currently amended. Claims 61 and 70 are withdrawn-currently amended. Reconsideration of the application in view of the amendments above and following remarks is requested. Entry of the amendment is proper because it places the case in better condition for appeal.

I: The Withdrawn Claims

Applicants respectfully submit that withdrawal of claims 61-80 and 82 is inappropriate under the PCT unity of invention requirement. Significantly, no objection to unity of invention was raised at any point of the PCT prosecution by either the International Searching Authority or the International Preliminary Examining Authority. Specifically, the International Preliminary Examining Authority did not object to unity of invention between claims to a recombinant marker gene, polynucleotide construct, a cell, or the methods claimed therein. Accordingly, there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features. See 37 C.F.R. 1.475(a). The USPTO should recognize the unity of invention in the previously submitted claims in this national stage application.

Further, pursuant to 37 C.F.R. 1.475(b), the claims relating to a recombinant marker gene, polynucleotide construct, a cell, relate to a product, *i.e.*, a product containing the inventive features of claim 37. Accordingly, all claims fall under the category of a product and process of use and there is unity of invention in this national stage application. See 37 C.F.R. 1.475(b)(2).

Applicant, therefore, respectfully submits that the withdrawal of claims 61-80 and 82 is improper. Applicant respectfully requests reconsideration and withdrawal of this determination.

II: The Rejection of Claims 37-60 under 35 U.S.C. 112, 1st Paragraph (Written Description)

Claims 37-60 are rejected under 35 U.S.C. 112 as allegedly lacking written description support. The Examiner alleges that the claims lack written description support for any sequence having at least 95% or 97% to SEQ ID NO:2. This rejection is respectfully traversed.

Initially, Applicants note that the 90% limitation is currently amended to 95%. Reconsideration is urged.

Section 112 of Title 35 provides, in relevant part, that:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. §112, ¶1 (emphasis added). The emphasized portion of §112, the written description requirement, “serves both to satisfy the inventor’s obligation to disclose the technologic knowledge upon which the patent is based, and to demonstrate that the patentee was in possession of the invention that is claimed.” *Capon v. Eshhar*, 418 F.3d 1349, 1357 (Fed. Cir. 2005).

The written description requirement of 35 U.S.C. § 112, first paragraph, is fulfilled when the patent specification describes the claimed invention in sufficient detail such that the claim limitations are described so that one of skill in the art would recognize that the applicants had invented the subject matter. See *Vas-Cath, Inc. v. Mahurkar*, 19 U.S.P.Q.2d 1111, 1116 (Fed. Cir. 1991); *In re Herschler*, 591 F.2d 693, 700 (C.C.P.A. 1979). The written description as filed is presumed to be adequate, unless or until sufficient evidence or reasoning to the contrary has been presented by the examiner to rebut the presumption. See *In re Marzocchi*, 169 U.S.P.Q. 367 (CCPA 1971).

The written description requirement can be met by showing that an invention is complete by disclosure of sufficiently detailed, relevant identifying characteristics, *i.e.*, complete or partial structure, other physical and/or chemical properties, functional characteristics when coupled with known or disclosed correlation between function and structure, or some combination of such characteristics. See, e.g., *University of California v. Eli Lilly and Co.*, 43 U.S.P.Q.2d 1398, 1404 (Fed. Cir. 1997); *Enzo Biochem v. Gen-Probe Inc.*, 63 U.S.P.Q.2d 1609, 1613 (Fed. Cir. 2002). A description of a claimed genus may be achieved by recitation of a representative number of species falling within the scope of the genus or by a recitation of structural features common to the members of the genus which constitute a substantial portion of the genus. See *University of California v. Eli Lilly and Co.*, 43 U.S.P.Q.2d at 1569.

The Patent Office’s *Written Description Training Materials*, Revision 1, (March 25, 2008), also provides guidance as to how to determine if there is sufficient written description to inform the artisan that the applicant was in possession of the claimed genus at the time the application was filed. These guidelines instruct that the written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species. For example, the Written Description Guidelines expressly state “The number of species required to represent a genus will vary, depending on the level of skill and knowledge in the art and the variability among the claimed genus. For instance, fewer species will be required where the skill and knowledge in the art is high, and more species will be required where the claimed genus is highly variable.” See pages 1-2. Further, the Examples in the Guidelines support that the written description requirement for a claimed genus may be satisfied through sufficient description in the specification of function of the described molecule which is correlated to its structure. See Example for Claim 4, pages 52-53.

“To satisfy the written description requirement, “the applicant does not have to utilize any particular form of disclosure to describe the subject matter claimed, but the description must clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed.” *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008) (quoting *In re Alton*, 76 F.3d 1168, 1172 (Fed. Cir. 1996)). “In other words, the applicant must ‘convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention,’ and demonstrate that by disclosure in the specification of the patent.” *Id.* (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991)). Such disclosure need not recite the claimed invention *in haec verbal*, but it must do more than merely disclose that which would render the claimed invention obvious. *Rochester*, 358 F.3d at 923; *Regents of the Univ. of Cal. V. Eli Lilly & Co.*, 119 F.3d 1559, 1566-67 (Fed. Cir. 1997); *see also PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306-07 (Fed. Cir. 2008) (explaining that §112 ¶1 “requires that the written description actually or inherently disclose the claim element”).

“Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention and the knowledge of one skilled in the art at the time an invention is made and a patent application is filed.” *Carnegie Mellon*, 541 F.3d at 1122 (citing *Enzo*, 323 F.3d at 963). The written description requirement is not satisfied by “[t]he appearance of mere indistinct words in a specification or a claim, even an original claim . . . A description of what a material does, rather than of what it is, usually does not suffice.” *Enzo*, 323 F.3d at 968 (citing *Eli Lilly*, 119 F.3d at 1568); *see Rochester*, 358 F.3d at 926 (“[G]eneralized language may not suffice if it does not convey the detailed identity of an invention.”).

Of course, what is adequate depends upon the context of the claimed invention. *See Capon*, 418 F.3d at 1358 (“The written description requirement must be applied in the context of the particular invention and state of the knowledge.”). The Court of Appeals for the Federal Circuit has articulated a variety of factors to evaluate the adequacy of the disclosure supporting “generic claims to biological subject matter.” *Id.* at 1359. These factors include “the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.” *Id.*

Initially, Applicants note that the present invention is enabled. The present invention is in the field of molecular biology and the level of skill in this art is high.

Under this standard, the Examiner’s conclusion that the specification requires more to meet the written description standard is plainly incorrect. The specification discloses, and one skilled in the art would clearly recognize that the scope of the present invention includes an amino acid sequence at least 95% identical to SEQ ID NO: 2. Examples of variants falling within the scope of the claimed invention include polypeptides having conservative amino acid substitutions in the amino acid

sequence of SEQ ID NO:2, which are clearly envisioned by an artisan once apprised of Applicants' invention. See for example page 14 which clearly explains that modifications can be made outside the regions critical to the function of the molecule and still result in an active polypeptide.

Further, at the time of filing the instant application, skilled artisans identified and showed possession of nucleic acids using % identity language or hybridization language. Further, skilled artisans identified and showed possession of peptides using % identity language. The specification identifies, and shows possession of a recombinant marker gene encoding an orotate transporter polypeptide including an amino acid sequence at least 60% identical to SEQ ID NO:2, preferably . . . at least 70%, 75%, 80%, 85%, 90%, 95%, 97% or most preferably at least 99% identical to SEQ ID NO:1. Use of % identity language is routine in the art and clearly understood by a skilled artisan. The specification provides a test on page 6 under "Sequence homology and alignment" which is sufficient to identify those species falling within the claimed % identity. Although not presently claimed, the specification further defines nucleic acids of the present disclosure as hybridizable. For example on page 5, under "Hybridization" the specification provides another method to identify nucleic acid molecules within the scope of the present disclosure. As the nucleic acids and peptides in accordance with the present disclosure are clearly identified using techniques known in the art, Applicants were clearly in possession of these molecules.

Accordingly, an artisan would reasonably conclude that Applicants were not only in possession of the nucleic acid sequence of SEQ ID NO:1 and polypeptide having the amino acid sequence of SEQ ID NO:2, but also that Applicants had possession of highly related sequences, as specified by the claims. Indeed, based on the high level of skill in the art, the phrase "an amino acid sequence at least 95% identical to SEQ ID NO: 2" itself conveys to the artisan that Applicants were in possession of the claimed invention.

Further, Applicants were clearly in possession of the claimed recombinant marker gene encoding an orotate transporter polypeptide disposed within a cell at the time of filing. Applicants direct the examiners attention to page 11 where the Applicants clearly instructed and showed possession of how to isolate related orotate transporters. On page 14, Applicants show possession of variant molecules and explain that modification of a nucleotide sequence encoding a polypeptide of the present disclosure may be necessary for the synthesis of a polypeptide, which includes an amino acid sequence that has at least one substitution, deletion and/or insertion as compared to SEQ ID NO:2. Suitable expression vectors are described on page 15. Suitable host cells are described in detail on page 17. Further the examples on page 23 explain that the orotate transporter of the present disclosure will be functional in a very broad spectrum of host cells, including both eukaryotic and prokaryotic cells. Non-limiting examples of functionality of the orotate transporter and its use is

demonstrated in three very different types of bacteria: *Lactococcus lactis* in example 1, *E. coli* in example 2, and *B. subtilis* in example 3.

Notwithstanding the above, the Examiner has not provided sufficient evidence or reasoning to rebut that the specification provides an adequate written description for highly related sequences claimed. In this regard, the Examiner contends that a number of additional representative species are required to be disclosed. However, given the high degree of identity recited in the claims, an extremely high degree of predictability exists as to the structure and function of sequences falling within the claims.

Therefore, Applicants respectfully submit that the specification contains a sufficient description of the structural and functional characteristics of the claimed sequences to fulfill the requirements of 35 U.S.C. 112. Reconsideration and withdrawal of the rejection are therefore respectfully requested.

III: The Rejection of Claims 37-60 under 35 U.S.C. 102(b)

Claims 37-60 are rejected under 35 U.S.C. 102(b) as allegedly anticipated by Bolotine. Claim 37 is currently amended. Bolotine does not disclose a recombinant marker gene encoding an orotate transporter polypeptide disposed within a cell comprising an amino acid sequence at least 95% identical to SEQ ID NO: 2, wherein the cell is pyrimidine auxotrophic. Reconsideration is urged.

IV. Conclusion

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Should any additional fee be due, the USPTO is authorized to charge the deposit account of Novozymes North America, Inc. i.e., Deposit Account No. 50-1701.

Respectfully submitted,

Date: May 21, 2009

/Michael W. Krenicky Reg. # 45411/
Michael W. Krenicky, Reg. # 45,411
Novozymes North America, Inc.
500 Fifth Avenue, Suite 1600
New York, NY 10110
(212)840-0097